University of Idaho
College of Agricultural and Life Sciences

Efficacy of Residual Herbicides for Weed Control & Reducing Weed Impacts on Alfalfa Yield & Quality

Albert Adjesiwor[1], James Gomm[1], Nevin Lawrence[2]

[1]University of Idaho, Kimberly ID

[2]University of Nebraska-Lincoln, Scottsbluff, NE

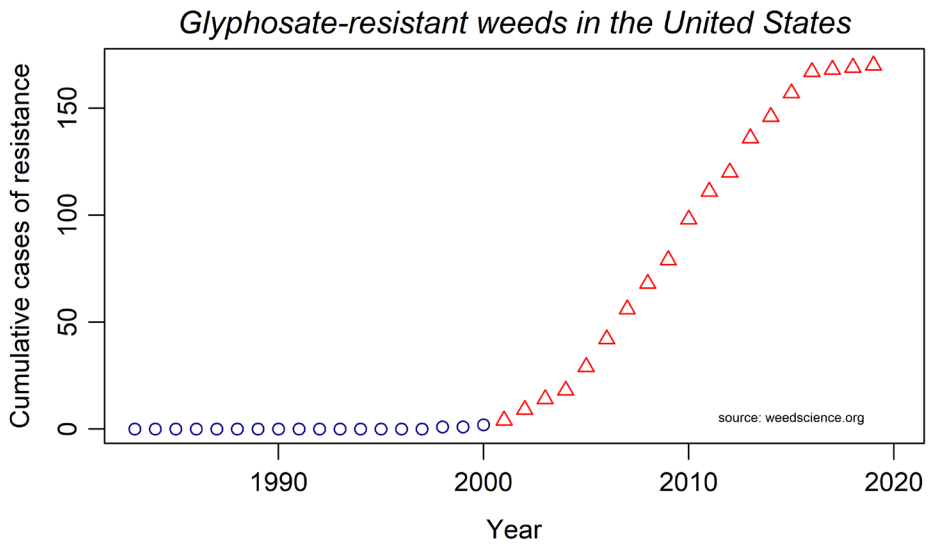
Background and objectives

Background:

- Annual weeds remain problematic in newly-seeded alfalfa
- Herbicide resistant weeds continue to erode our ability to effectively control weed

Objectives:

1. Evaluate the efficacy of residual and postemergence herbicide programs in newly seeded alfalfa; and
2. Determine the impact of weed control on alfalfa yield and nutritional value.



Treatments and design

	Treatment	Timing
1	Untreated	
2	Eptam (3pt/a)	A
3	Warrant (1.5 qt/a)	B
4	Raptor (5 oz/a)	C
5	Raptor	C
	Maestro 2EC (1.5 pt/a)	C
6	Eptam (3pt/a)	A
	Raptor (5 oz/a)	C
7	Eptam (3pt/a)	A
	Raptor (5 oz/a)	C
	Maestro 2EC (1.5 pt/a)	C
8	Warrant (1.5 qt/a)	B
	Raptor (5 oz/a)	C
9	Raptor (5 oz/a)	C
	Prowl (64 oz/a)	D
10	Raptor (5 oz/a)	C
	Warrant (1.5 qt/a)	D
11	Raptor (5 oz/a)	C
	Chateau (3 oz/a)	D
12	Warrant (1.5 qt/a)	B
	Prowl (64 oz/a)	D
13	Warrant (1.5 qt/a)	B
	Warrant (1.5 qt/a)	D
14	Warrant (1.5 qt/a)	B
	Chateau (3 oz/a)	D
15	Raptor (5 oz/a)	C
	Gramoxone 2 (16 oz/a)	D
16	Alion (5 oz/a)	D

- 15 treatment including the untreated check
- Application timings:

  “A” = Preemergence

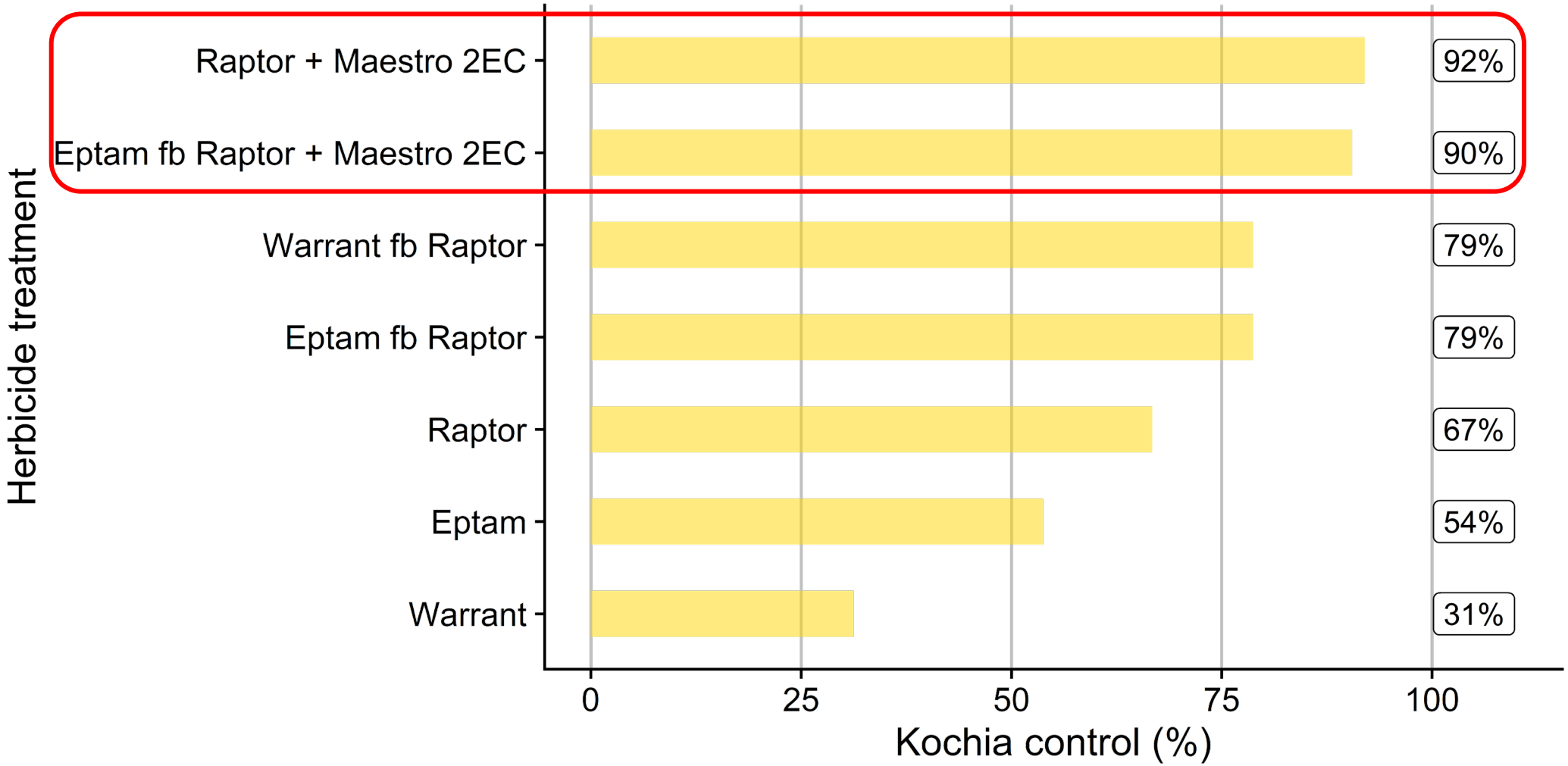
  “B” = ~80% alfalfa emergence

  “C” = 3rd trifoliate

  “D” = after first cut

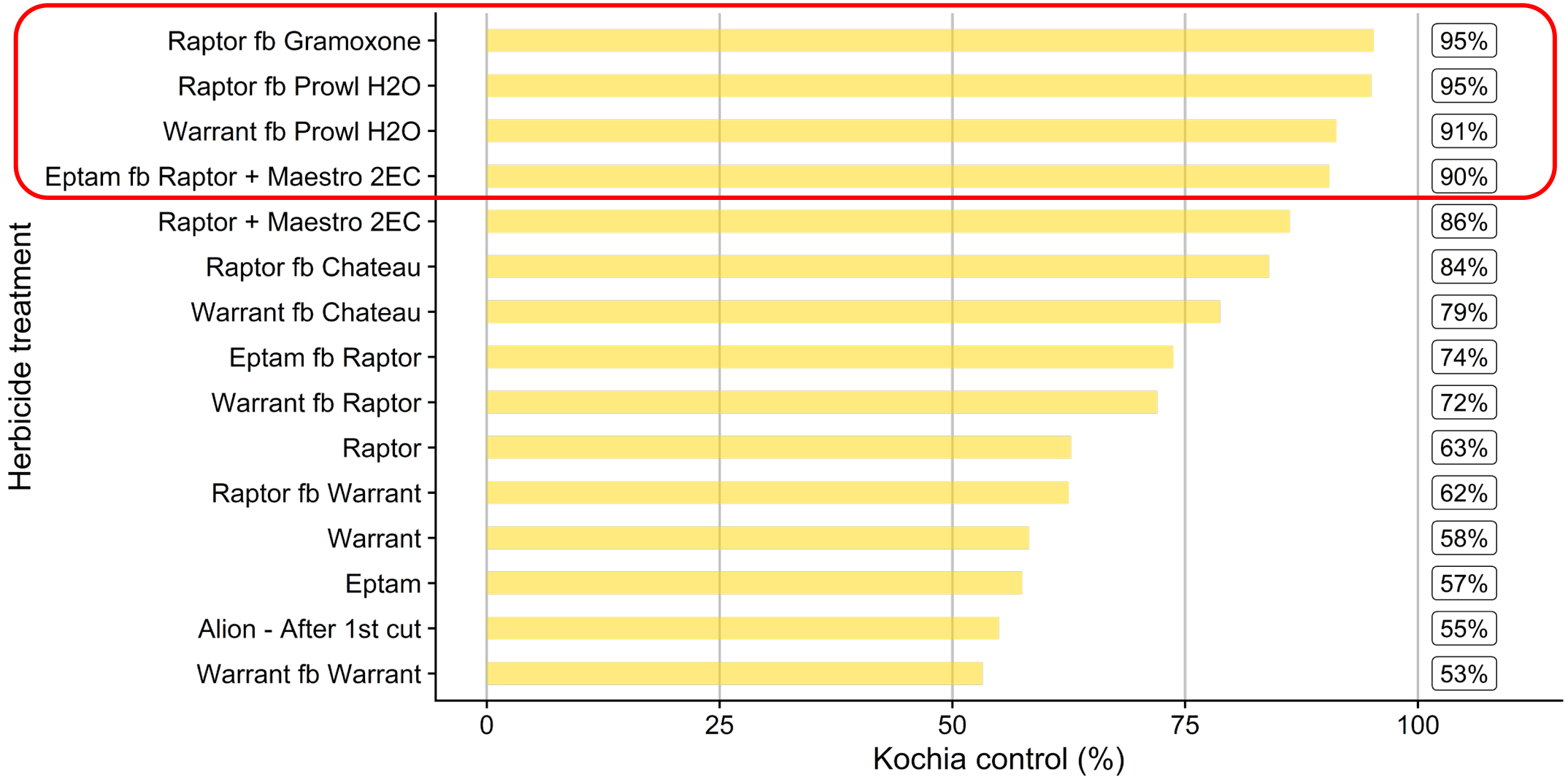
NOTE: Alion is not labeled for alfalfa

Kochia control at 1st cut



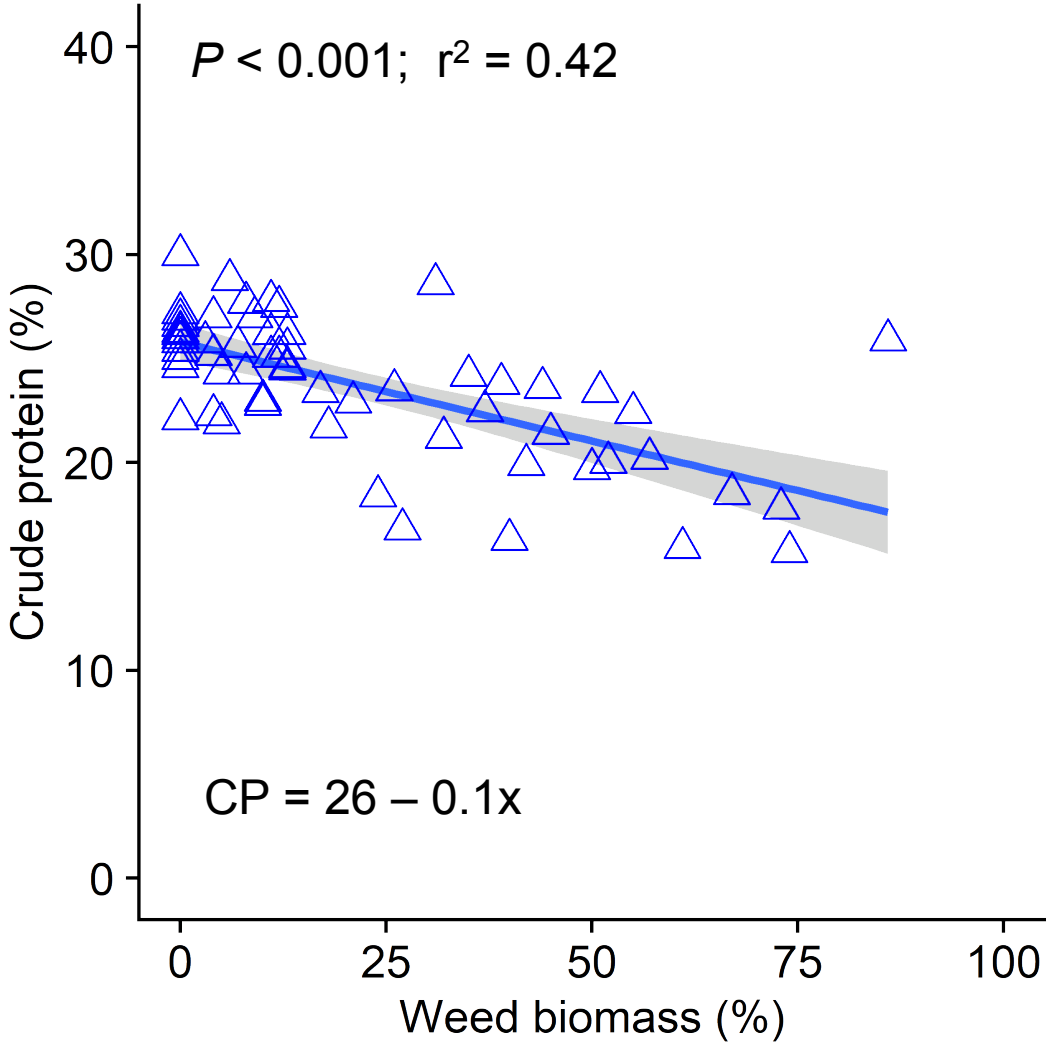
fb = followed by

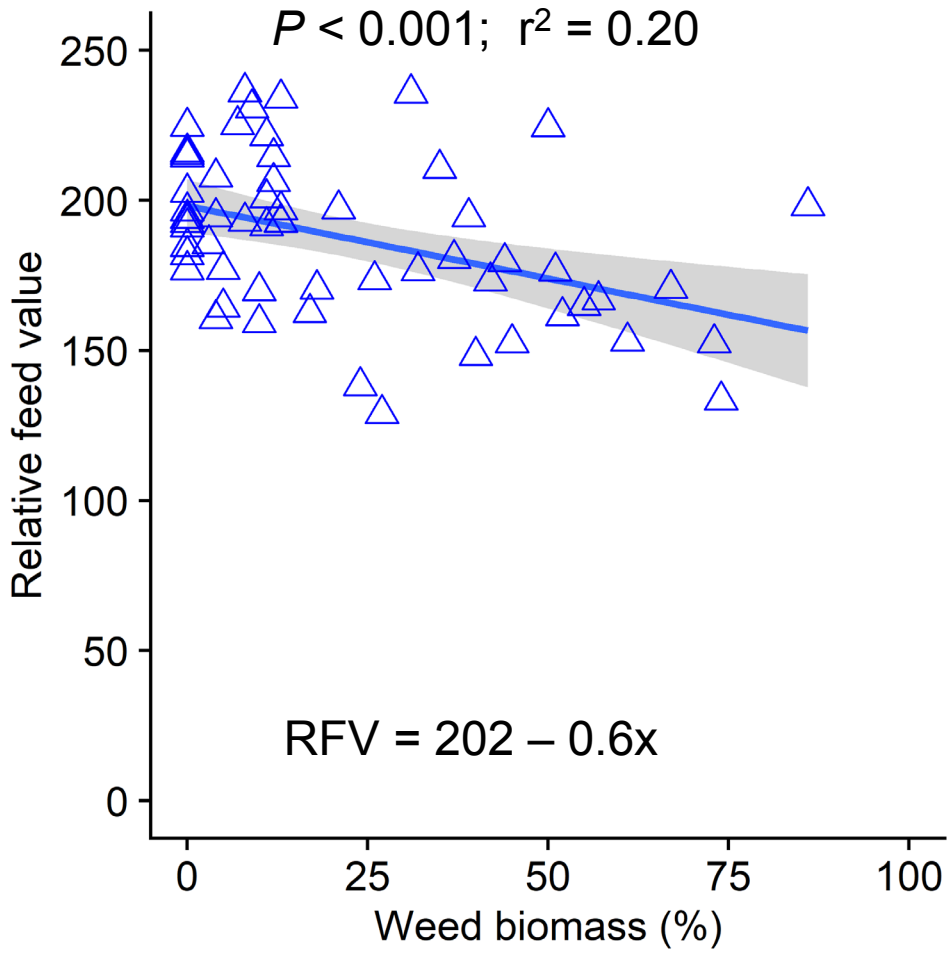
Kochia control at 2nd cut



fb = followed by

Effect of weed biomass on forage quality





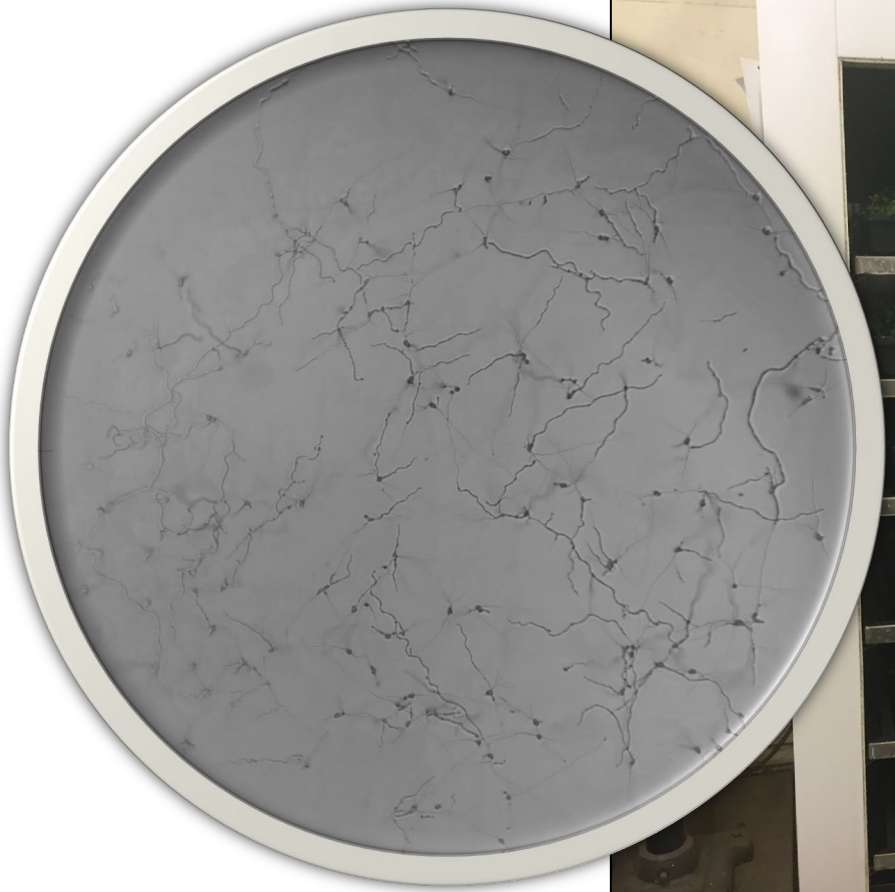
Acknowledgment

- UI Kimberly weed science crew
- Dr. Nevin Lawrence's Lab, University of Nebraska-Lincoln
- Funding:

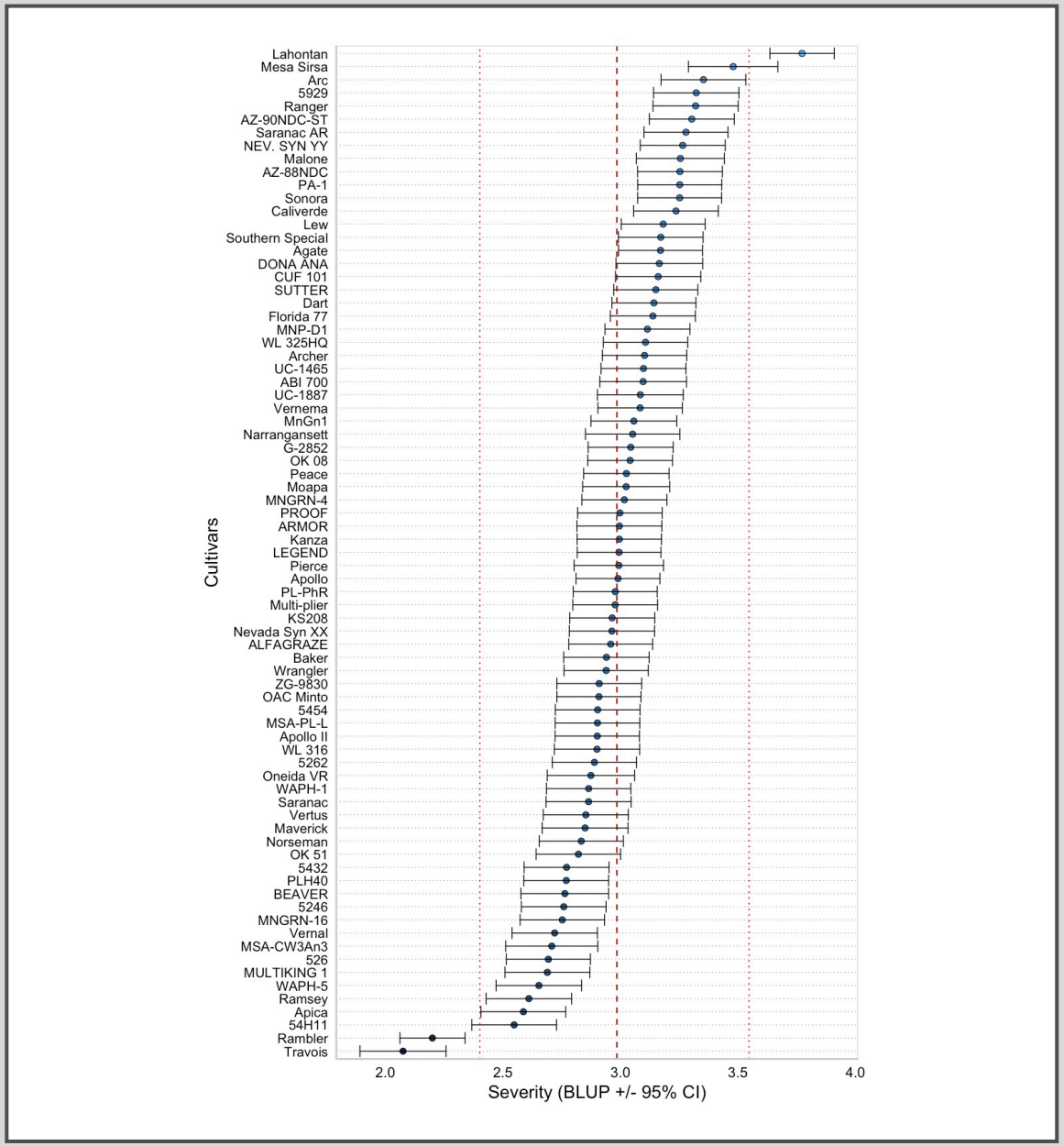
Twitter: @IdahoWeeds
Email: aadjesiwor@uidaho.edu
Website: www.uidaho.edu/weed-science

Spring black stem and stemphylium leaf spot resistance screening in the USDA-ARS National Plant Germplasm System's *Medicago* spp. genetic resources

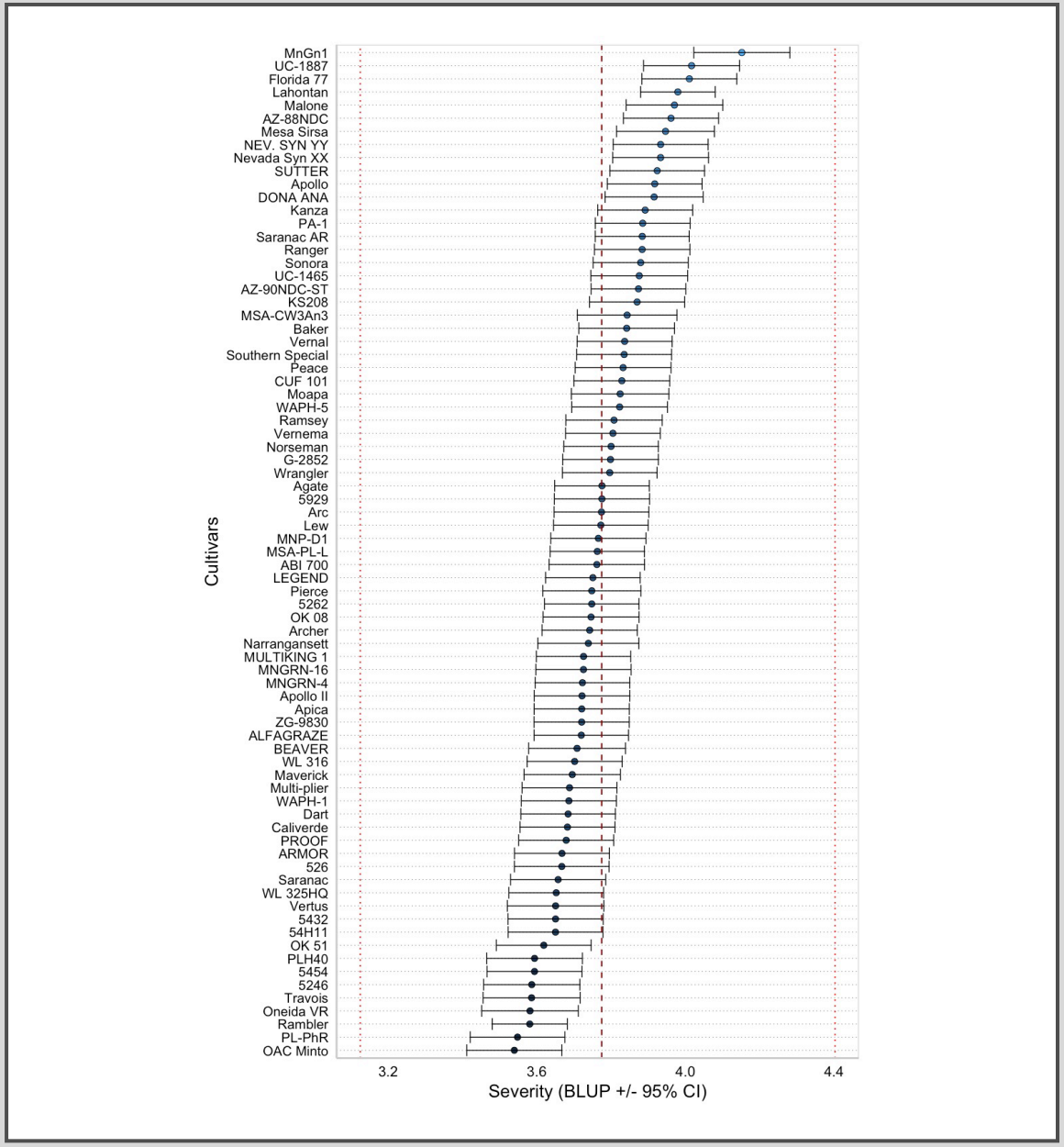
Brian M. Irish



USDA
United States Department of Agriculture
Agricultural Research Service



Concentration $1x10^4$ spores/ml



Concentration $1x10^6$ spores/ml

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WASHINGTON STATE UNIVERSITY EXTENSION

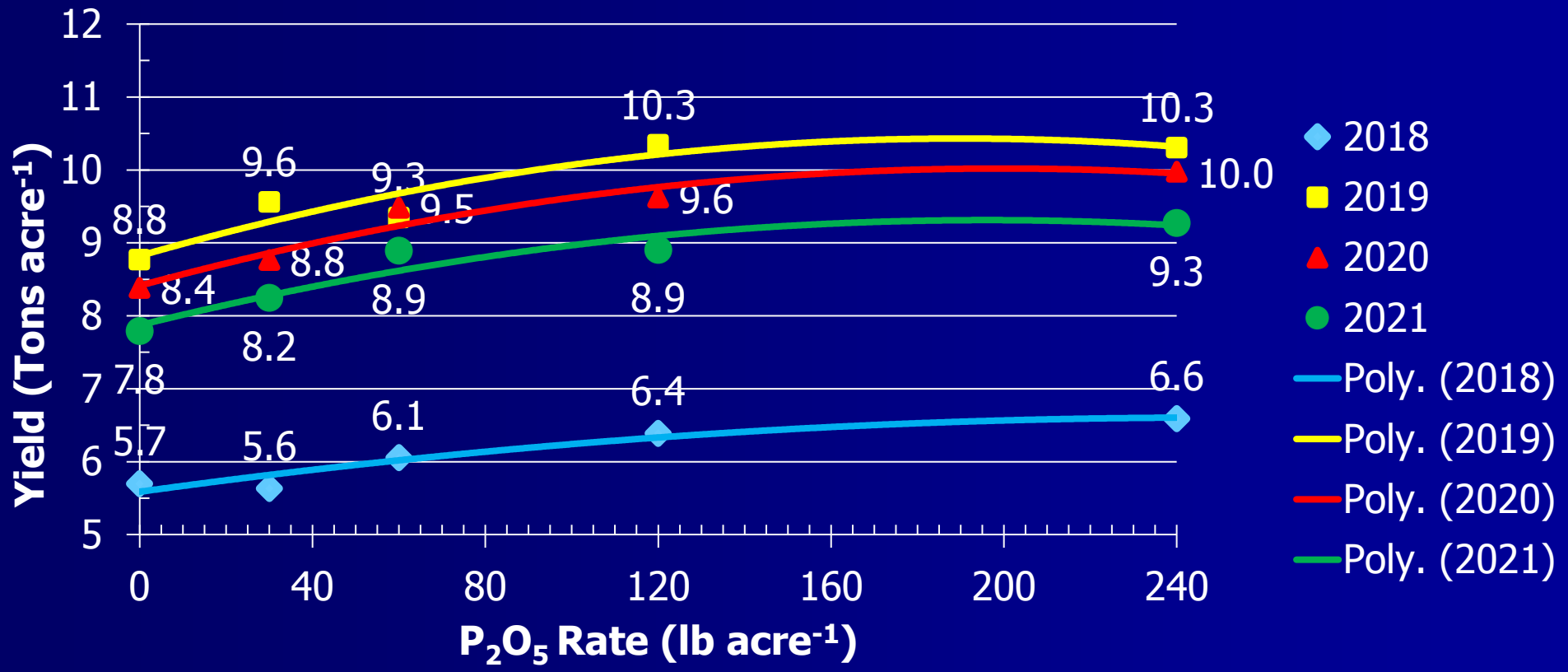
Developing Practical Phosphorus and Potassium Tissue Test Recommendations and Utilizing Struvite in Modern Alfalfa Systems III

Steve Norberg, Don Llewellyn, Steve Fransen, Joe Harrison, Erin Mackey, Liz Whitefield, and Jon Paul Driver

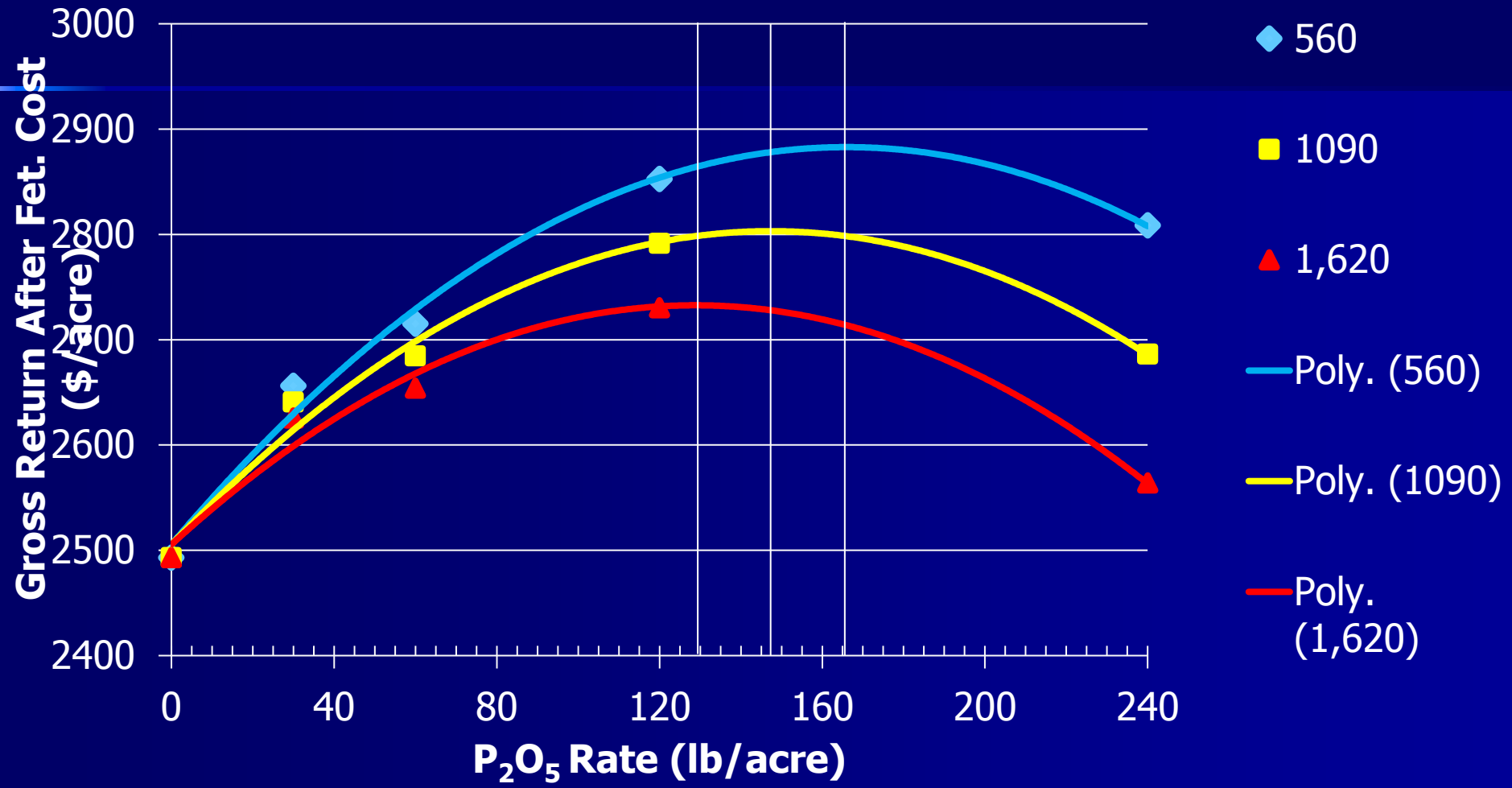
Alfalfa

U.S. Alfalfa Farmer Research Initiative

Yield as influenced by phosphorus rate by year



Gross return after fertilizer cost assuming $300 per ton hay



Optimum dropped from 166 to 125 lbs P_2O_5 when Olsen soil test P was ~8 ppm when MAP fertilizer price increased from 460 to 1620 $/ton.

Drop in Mono-Ammonium Phosphate Rate Based on Hay and Fertilizer Price In Alfalfa and Optimal Percent Phosphorus

Fertilizer Price Of MAP (11-52-0)	Hay Price $150 per Ton	Hay Price $200 per Ton	Hay Price $250 per Ton
	Optimum Fertilizer Rate Opt. lbs P_2O_5/ac/(% of Base Rate)/Opt. % P Tissue Conc.		
Base Price $ 560/Ton of MAP ($0.54 lb P_2O_5)	152/(100)/0.35	167/(100)/0.36	174/(100)/0.36
95% increase in Fert. Price $1090/Ton ($1.05 lb P_2O_5)	112/(74)/0.32	139/(83%)/0.34	154/(88)/0.35
189% Increase in Fert. Price $1620/Ton ($1.56 lb P_2O_5)	72/(47)/0.29	113/(68%)/0.32	133/(77)/0.34

Drop in Potassium Chloride (0-0-60) Rate Based on Hay and Fertilizer Price In Alfalfa

Fertilizer Price Of KCl^- (0-0-60)	Hay Price $150 per Ton	Hay Price $225 per Ton	Hay Price $300 per Ton
	Optimum Fertilizer Rate lbs K_2O/acre / (Percentage of Base Application)		
Base Price $ 446/Ton of KCl^- (0-0-60), $0.37 lb K_2O	204/(100%)	246/(100%)	265/(0%)
122% increase in Fert. Price $990/Ton, $0.83 lb K_2O	44/(22%)	144/(59%)	191/(72%)
244% Increase in Fert. Price $1534/Ton, $1.28 lb K_2O	0/(0%)	43/(17%)	116/(44%)

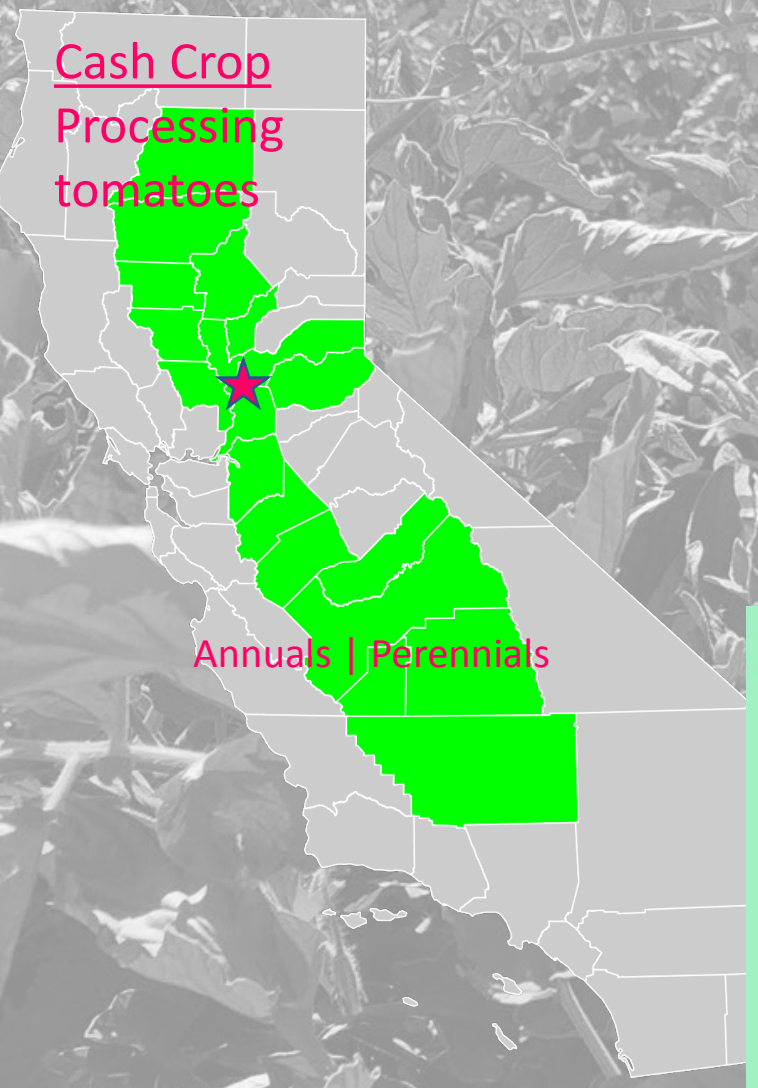
Characterizing the Benefits of Alfalfa in Rotation & Communicating Value of Environmental Services to the Public

Thanks to NAFA For funding this innovative work

Nicole Tautges
Dan Putnam
Sandipan Samaddar

UC DAVIS
UNIVERSITY OF CALIFORNIA

Methods In a Minute



TWO ROTATIONS

Q: What benefits to including alfalfa as a perennial?

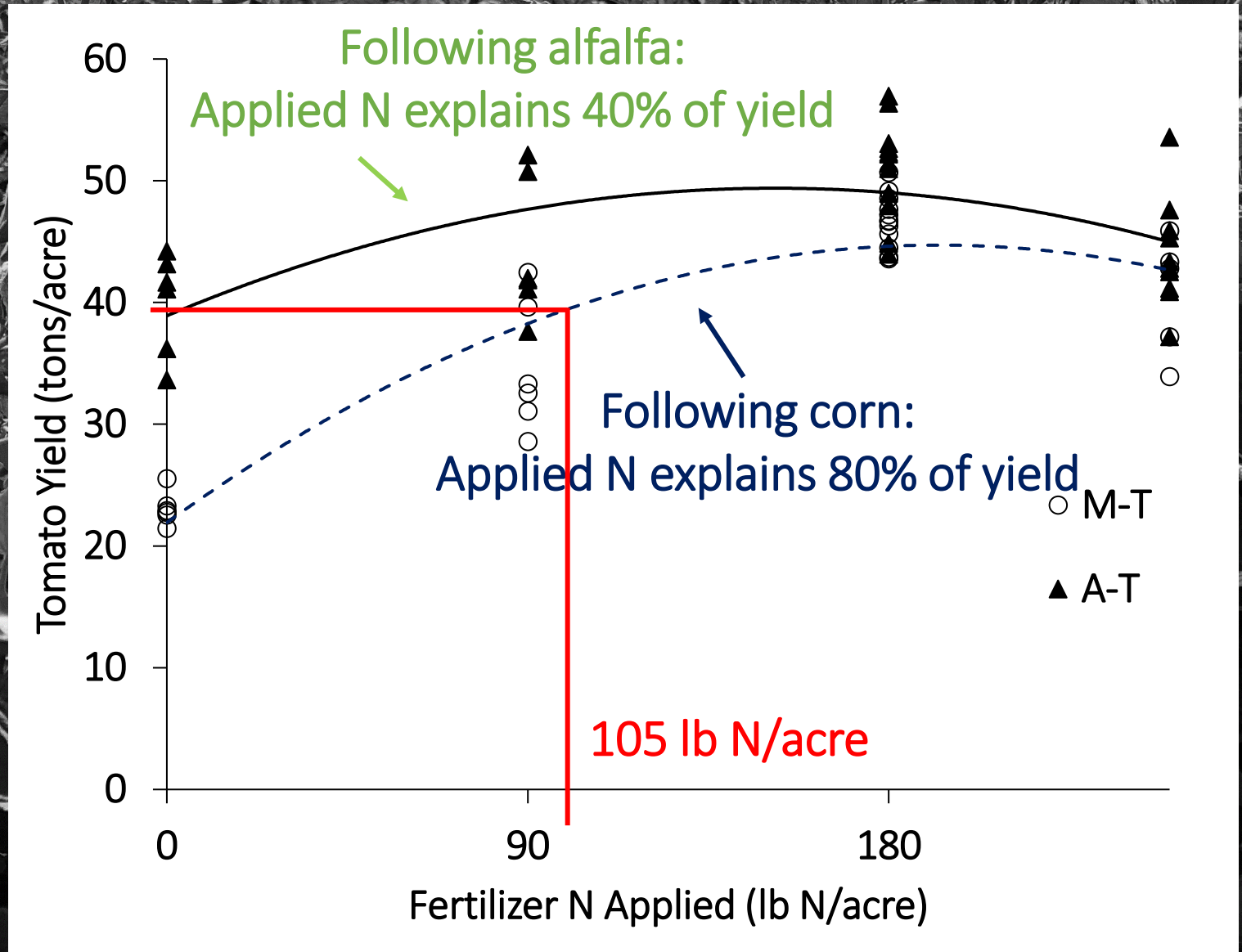
Alfalfa – Tomato vs. Annual Maize – Tomato



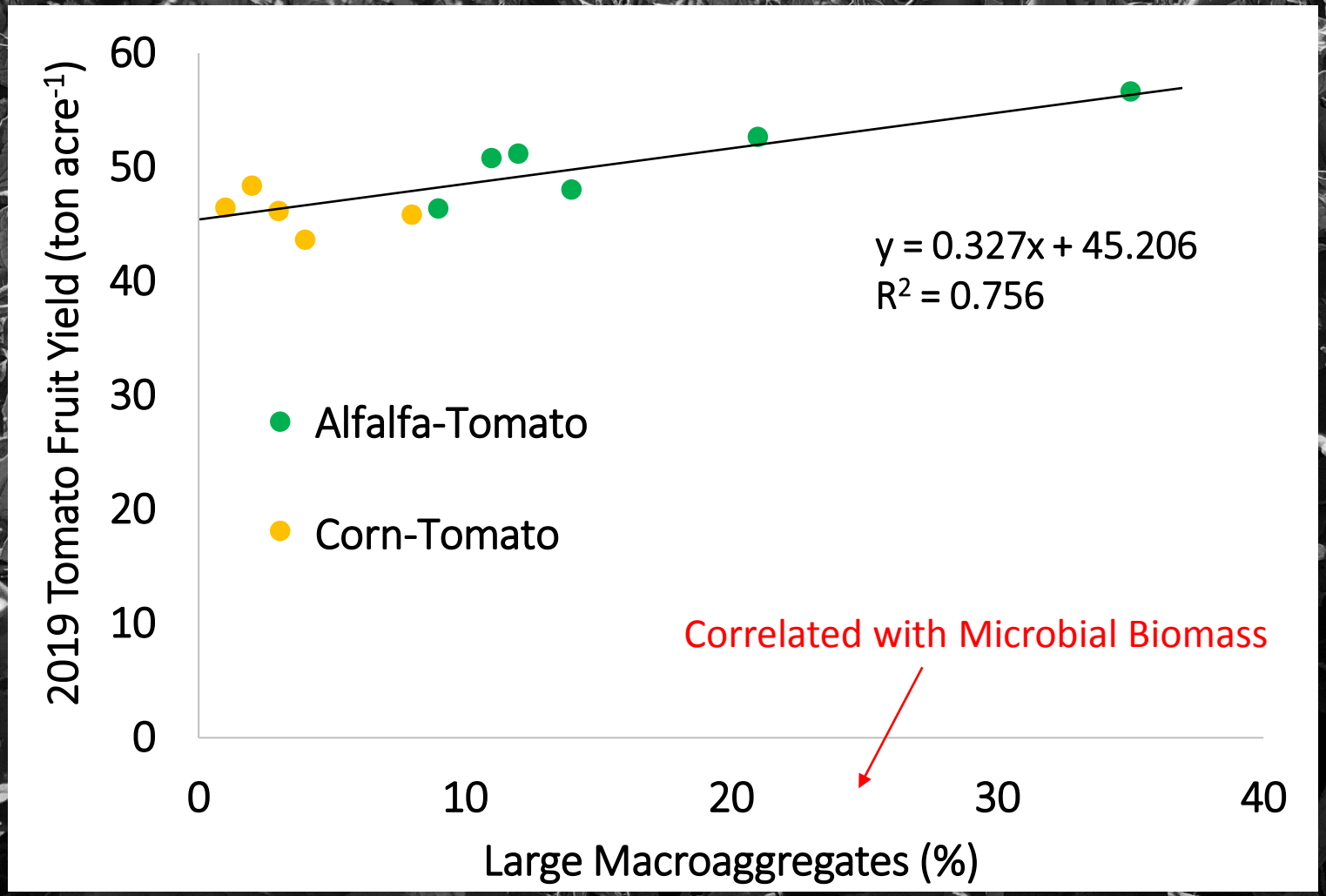

Research Questions

1. Can we detect alfalfa effects on the soil microbial community?
2. How do soil microbial community changes with alfalfa affect N cycling?
3. Do these effects of alfalfa PERSIST beyond the alfalfa year into subsequent years in rotation?

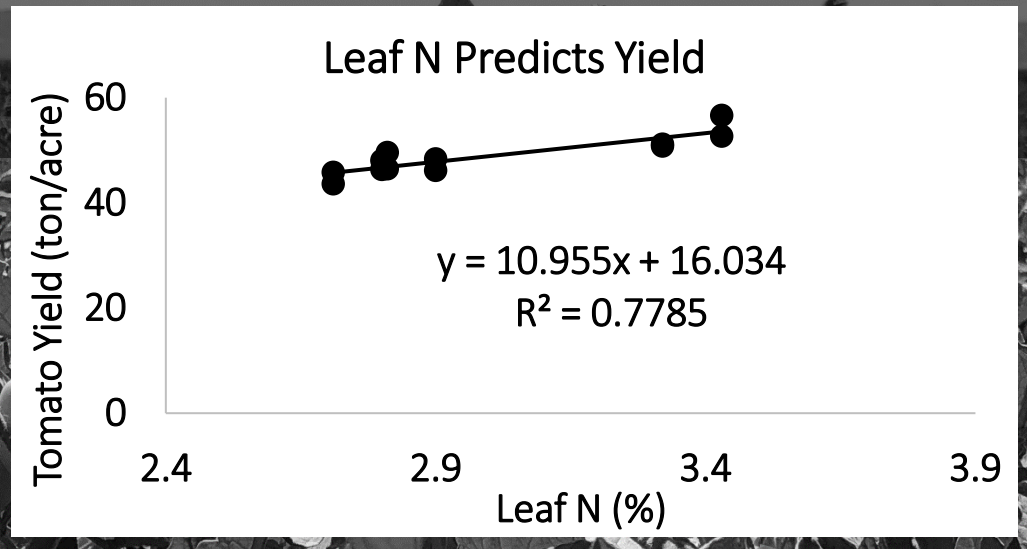
Residual Nitrogen – Following Corn vs. Alfalfa

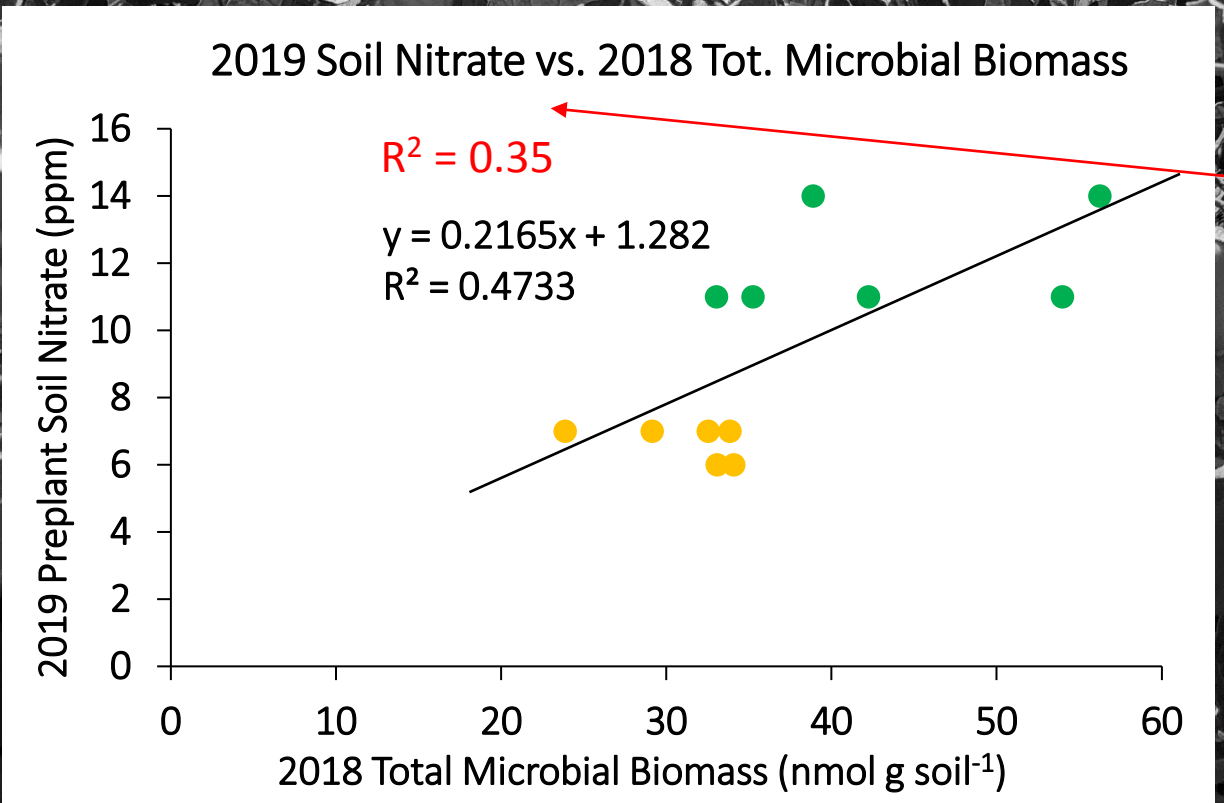


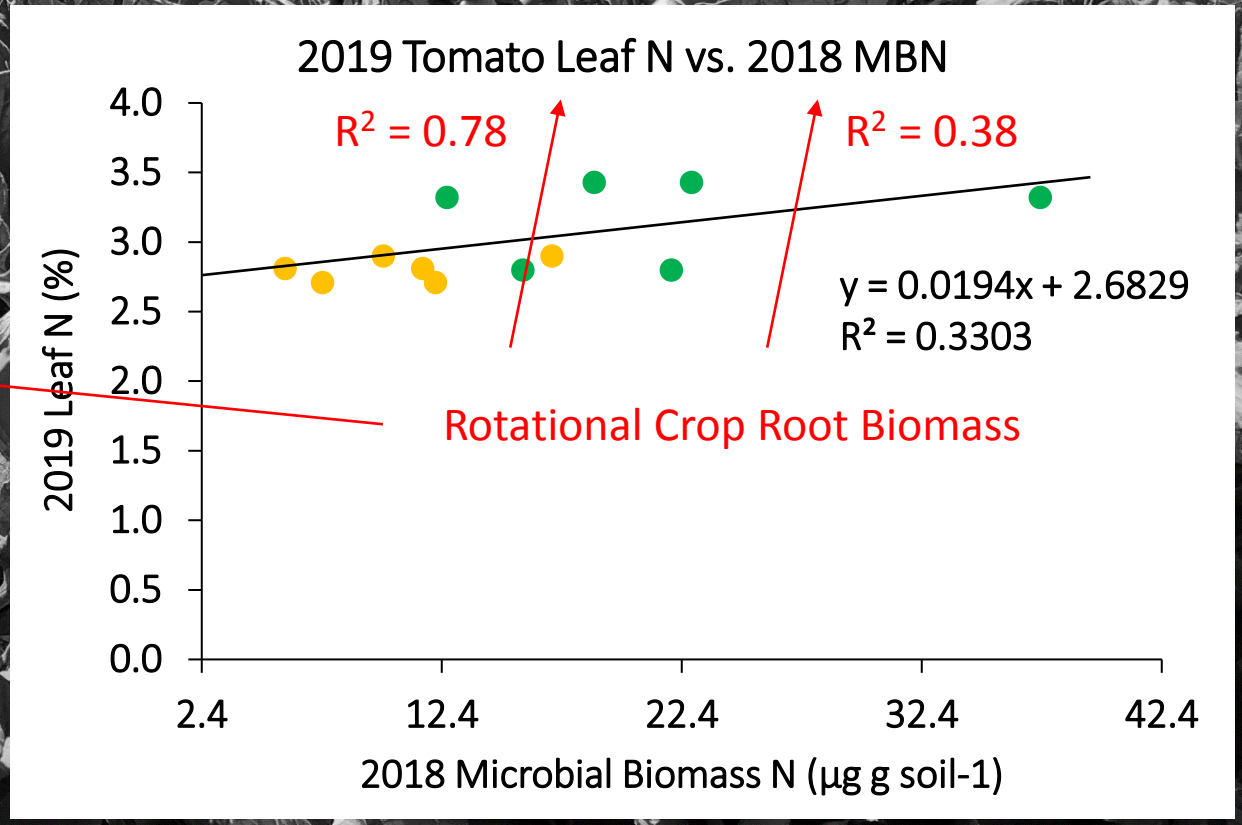
Connecting Yields to Rotation Crop Factors -- *Physical*



Biological Nutrient Cycling?







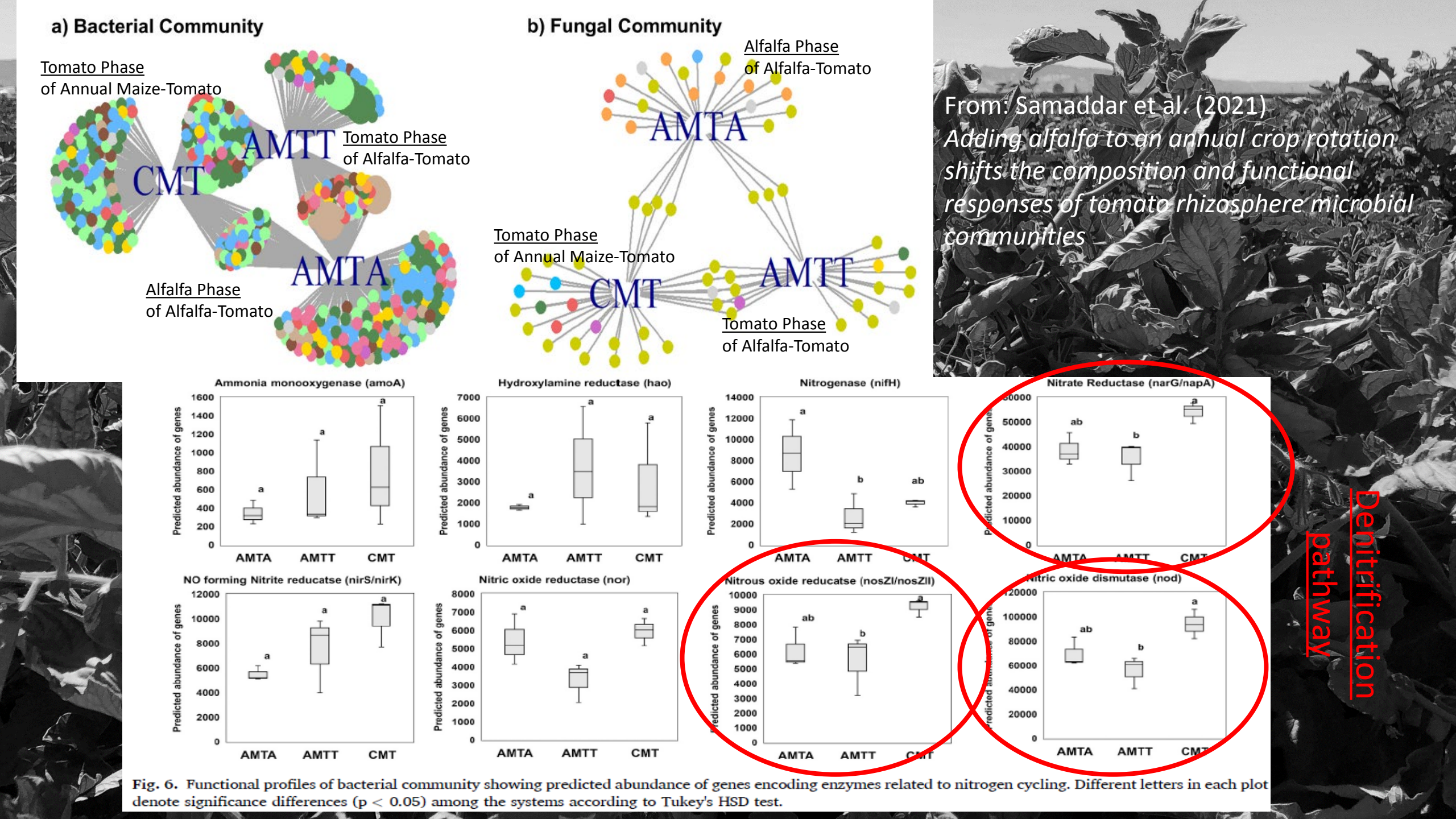


Fig. 6. Functional profiles of bacterial community showing predicted abundance of genes encoding enzymes related to nitrogen cycling. Different letters in each plot denote significance differences ($p < 0.05$) among the systems according to Tukey's HSD test.